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Process for the Controlled Preparation of Ultrafine Magnetic Particle Composites Homogeneously Dispersed in a Dielectric Matrix

Abstract

A chemical process for producing bulk quantities of an iron-silica gel composite in which particle size, form, and magnetic state of the iron can be selected. The process involves polymerizing an ethanolic solution of tetraethylorthosilicate, ferric nitrate and water at low temperature under the influence of an HF catalyst. The chemical and magnetic states of the iron in the resultant composite are modified in situ by exposure to suitable oxidizing or reducing agents at temperatures under 400° C. Iron-containing particles of less than 200 angstrom diameter, homogeneously dispersed in silica matrices may be prepared in paramagnetic, superparamagnetic, ferrimagnetic and ferromagnetic states.

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References

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Status of Availability

This invention is available for licensing.

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